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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/561,128 | KAKURA, YOSHIKAZU | |
| | Examiner | Art Unit | |
| | TANGELA T. CHAMBERS | 2617 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 January 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *2-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 January 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. This action is in response to the preliminary amendment filed on 1/28/2010.
   (a) Claim 1 has been canceled.
   (b) Claims 2, 4-5, 10-11 and 17 have been amended.
   (c) Claims 2-17 are rejected.

### *Priority*

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) which provides a priority date of June 30, 2003. The certified copy was filed in the instant application on December 16, 2005.

### *Information Disclosure Statement*

3. The IDS filed on October 10, 2009 has been acknowledged by the examiner. However, the reference was not considered as it is written entirely in Japanese.

### *Response to the Arguments*

4. The applicant's arguments filed on 1/28/2010 have been fully considered, but they are not persuasive. In the Remarks, the applicant has argued in substance:

(1) The applicant argued features, i.e., a radio transmission device that transmits two or more signal sequences with two or more antennas and changing the maximum value of the spread codes assigned to the transmission antenna.

Response:

(1) In regards to independent claims 2 and 13, Kuwahara discusses a transmitter having only one antenna for the sake of simplicity but a plurality of antennas would be equally effective in the invention disclosed. (See: Column 10, Lines 32-37). Thus Kuwahara teaches a radio transmission device transmitting two or more signal sequences with two or more antennas.

(2) In regards to independent claims 10 and 16, the recitation "a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

(3) Further in regards to independent claims 10 and 16, Sudo discusses increasing the number of spreading codes when necessary, and only assigning codes to every other subcarrier when reception quality is low. Thus Sudo shows the limitation of changing the maximum value of the spread codes assigned to the transmission antenna.

(4) Regarding the applicant's arguments within several of the dependencies, Kuwahara or Sudo discloses the limitations or Kuwahara or Sudo as modified by secondary analogous references disclose the limitations.

As a result, the argued features read upon the references as follows:

### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of

this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2-4, and 13-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1).

As per claim 2, Kuwahara discloses:

- ***A spread code assigning method, in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning spread codes to each of the transmission antennas:*** (Kuwahara, Column 1, Lines 11-21 and FIG. 1, Column 10, Line 25 – Column 11, Line 12), Kuwahara teaches a spread code assigning method with a plurality of antennas, a transmitter and a receiver used for both receiving and demodulating.
- ***calculating a correlation value of each of the propagation paths between the transmission antennas and the reception antennas;*** (Kuwahara, Column 7, Line 55 – Column 8, Line 16, "[A] code correlation of a plurality of spread codes used for communication are calculated[.]").
- ***preferentially assigning, to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value or spread codes having a small cross correlation value to spread codes of the jth transmission antenna corresponding to the correlation value,*** (Kuwahara, Column 5, Line 61 – Column 6, Line 2 and Column 3, Lines 39-64, "[A]t the transmitting side, an interference power level per call is measured, and when the measured interference power level per call exceeds a predetermined threshold, a procedure for spread

code reassignment is carried out to change a spread code for a channel corresponding to each call of interest."), Kuwahara teaches that when a spread code reassignment is carried out, ideally it is a short (orthogonal) code or a long code with orthogonality that is assigned.

- ***assigning, to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas,*** (Kuwahara, Column 11, Lines 56-65, "[T]here are two possible triggers of spread code reassignment. ... [A] second trigger thereof is a condition that each of a code correlation and a propagation path correlation deviates from an optimum state[.]"), Kuwahara teaches reassignment of spread codes if the threshold is exceeded; otherwise orthogonality is not considered and the spread code remains unchanged.

As per claims 3 and 14-15, Kuwahara further discloses:

- ***wherein spread codes having a small cross correlation value to the spread codes of the jth transmission antenna are spread codes orthogonal to the spread codes of the jth transmission antenna,*** (Kuwahara, Column 3, Lines 35-51 and Column 2, Lines 12-21 and 38-46, "In short code assignment, an orthogonal code having a single-symbol cycle is used for identifying each of plural communication channels in a sector and for reducing possible interference between communication channels.").

As per claim 4, Kuwahara further discloses:

- ***wherein a standard correlation value is calculated based on each of the correlation values of the propagation paths between the M transmission antennas and the N reception antennas, in the case of preset L threshold values of $x_0$, $x_1$, ..., $x_{(L-1)}$ ($0 \leq x_0 \leq x_1 \leq \ldots \leq x_{(L-1)} \leq 1$), the standard correlation value is $x_p$ or more and below $x_{p+1}$ (p is an integer of 0 or more and (L-1) or less), a code multiplex number for the transmission antenna corresponding to the standard correlation value is set to be (L-p).*** (Kawahara, Column 7, Line 55 – Column 8, Line 16), Kawahara teaches a method to calculate a correlation value based on each of the correlation values of the propagation paths.

As per claim 13, it is rejected under the same reasons set forth in connection of the rejection of claim 2, and Kuwahara further discloses:

- ***transmitting the calculated result as propagation path correlation information,*** (Kuwahara, Column 7, Line 55 – Column 8, Line 16 and Column 10, Lines 44-60, "It is therefore required for the transmitter 9 to notify the receiver 19 of spread code reassignment.").
- ***wherein the transmitter is provided with a spread code assigning unit,*** (Kuwahara, FIG. 1 and Column 10, Lines 44-53, "A code generator 2 serves to determine and generate a spread code under direction of a code controller 1.").

Claims 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Sudo (US Patent No. 7,298,722 B2).

As per claim 10, Sudo discloses:

- ***A spread code assigning method, in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning spread codes to each of the transmission antennas comprising:*** (Sudo, Abstract, FIG. 20 and Column 15, Line 4-39), Sudo teaches a spread code assigning method with a plurality of antennas, a transmitter and a receiver used for both receiving and demodulating.
- ***detecting a reception quality at a time when each of said code spread transmission signals is received;*** (Sudo, Column 19, Lines 16-26, "In receiving system 1510, the reception levels of subcarrier groups G5 and G6 are detected by propagation path compensation circuit 112 based on the reception level of a known signal[.]").
- ***reducing, in the case that the detected reception quality is below an object minimum value, a maximum value of number of the spread codes assigned to the transmission antenna corresponding to the reception quality,*** (Sudo, Column 25, Line 46

– Column 26, Line 24 and Column 18, Lines 7-51, "[T]he error rate characteristics of a code division multiplexed signal with a low degree of signal multiplexing can be significantly improved by allocating a code division multiplexed signal for which the degree of signal multiplexing is set low at intervals of a plurality of subcarriers.").

- ***increasing, in the case that the detected reception quality exceeds an object maximum value, the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the reception quality,*** (Sudo, Column 25, Line 46 – Column 26, Line 24, Column 16, Lines 27-52 and Column 17, Lines 4-10, "When the spreading code for the start of a frame is changed, as in Embodiment 11, it is necessary to assign a plurality of spreading codes to a known signal, and therefore the number of spreading codes needed increases accordingly.").

As per claim 11, Sudo further discloses:

- ***wherein as the reception quality, any of a packet success rate, a signal to interference signal power ratio, and a bit error rate is used,*** (Sudo, Column 6, Lines 40-47 and Column 25, Lines 59-65), Sudo teaches signal to interference ratio and received signal strength indicator as ways to determine reception quality.

### *Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1), in view of Aoki et al (Aoki) (US Patent Publication No. 2004/0028157 A1).

As per claim 5, Kuwahara teaches calculating a correlation value but does not specifically disclose:

- ***wherein a correlation value compared with the threshold value is a standard correlation value calculated based on a cross correlation value of each of the propagation paths between the M transmission antennas and the N reception antennas,*** However Aoki, in an analogous art discloses the limitation. (Aoki, Paragraphs [0070]-[0074]), Aoki teaches calculating a correlation value based on a cross correlation value and comparing the correlation value to a threshold value.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Aoki into the teaching of Kuwahara to compare a correlation value calculated based on the cross correlation value of each propagation path with a threshold value. The modification would be obvious because one of ordinary skill in the art would want the benefit of improving error rate of the signals and reducing power consumption in receivers. (Aoki, Paragraph [0008]).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Sudo (US Patent No. 7,298,722 B2).

As per claim 6, Kuwahara teaches calculating a correlation value but does not specifically disclose:

- ***wherein the standard correlation value is the maximum value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second ..., (i-1)th, (i+1)th ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas,*** However Sudo, in an analogous art discloses the limitation. (Sudo, FIG. 22 and Column 17, Lines 12-38), Sudo teaches determining a maximum value of the

correlation results.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Sudo into the teaching of Kuwahara to have the correlation value be the maximum among the correlation values obtained. The modification would be obvious because one of ordinary skill in the art would want the benefit of making spectral efficiency compatible with error rate characteristics. (Sudo, Column 3, Lines 1-2).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Aoki et al (Aoki) (US Patent Publication No. 2004/0028157 A1) and in further view of Sudo (US Patent No. 7,298,722 B2).

As per claim 7, it is rejected under the same reasons as set forth in connection of the rejection of claim 6.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Goto (US Patent Publication No. 2002/0037030 A1).

As per claim 8, Kuwahara teaches calculating a correlation value but does not specifically disclose:

- ***wherein the standard correlation value is an average value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second ..., (i-1)th, (i+1)th ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas,*** However Goto, in an analogous art discloses the limitation. (Goto, Paragraphs [0019]-[0023]), Goto teaches averaging the correlation values in order to eliminate

noise and improve accuracy in detecting the peak value of correlation values.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Goto into the teaching of Kuwahara to have the correlation value be the average value among the correlation values obtained. The modification would be obvious because one of ordinary skill in the art would want the benefit of consuming less power while maintaining accuracy of peak detection for a correlation value between a received signal and spreading codes. (Goto, Paragraph [0045]).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Aoki et al (Aoki) (US Patent Publication No. 2004/0028157 A1) and in further view of Goto (US Patent Publication No. 2002/0037030 A1).

As per claim 9, it is rejected under the same reasons as set forth in connection of the rejection of claim 8.

Claims 12, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (US Patent No. 7,298,722 B2) in view of Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1).

As per claim 12, Sudo teaches assigning spread codes but does not specifically disclose the following limitations. However, Kuwahara in an analogous art discloses:

- ***wherein a priority order of assigned spread codes is set for each transmission antenna,*** (Kuwahara, Column 19, Lines 10-25 and Column 9, Lines 12-30).
- ***in the case that the maximum value of the number of the spread codes assigned to each transmission antenna is relatively small, different spread codes orthogonal to each other are assigned to each of the transmission antennas,*** (Kuwahara, Column 3, Lines 35-51 and Column 2, Lines 12-21, "Although orthogonalization using short codes is very advantageous for reduction in co-channel interference, there is a problem that the allowable

number of orthogonal codes is limited in terms of a short code length.").

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kuwahara into the teaching of Sudo to assign spread codes orthogonal to each other when the number of spread codes assigned to each transmission antenna is relatively small. The modification would be obvious because one of ordinary skill in the art would want the benefit of dynamically assigning codes wherein an optimum spread code for minimizing inter-channel interference is used based on conditions between the transmitter and receiver. (Kuwahara, Column 4, Lines 40-56).

Claim 16 is rejected under the same reasons as set forth in connection of the rejection of claim 10, and Sudo teaches a transmitter and assigning spread codes but does not specifically disclose:

- ***the transmitter is provided with a spread code assigning unit for assigning spread codes to each of the transmission antenna based on the code multiplex number control information,*** However Kuwahara, in an analogous art discloses the limitation. (Kuwahara, FIG. 1, Column 10, Lines 44-53).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kuwahara into the teaching of Sudo to have a transmitter with a spread code assigning unit. The modification would be obvious because one of ordinary skill in the art would want the benefit of dynamically assigning codes wherein an optimum spread code for minimizing inter-channel interference is used based on conditions between the transmitter and receiver. (Kuwahara, Column 4, Lines 40-56).

As per claim 17, Sudo further discloses:

- ***wherein the reception quality is any of a packet success rate, a signal to interference signal power ratio, and a bit error rate,*** (Sudo, Column 6, Lines 40-47 and Column 25, Lines 59-65).

***Conclusion***

7. The prior art not relied upon but considered pertinent to applicant's disclosure is made of record and listed on form PTO-892.

**THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANGELA T. CHAMBERS whose telephone number is 571-270-3168. The examiner can normally be reached Monday through Thursday, 10:00am-6:30pm Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nick Corsaro, can be reached at 571-272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-270-4168.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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